

**REMARKS**

The Final Office Action dated April 6, 2004 has been reviewed carefully and Applicant has the following remarks concerning the new grounds of objection and rejection, and based upon these remarks reconsideration of the objection and rejection is respectfully requested.

**Objection to the Specification**

The Examiner indicated that the amendment filed on March 2, 2004 was objected to on the grounds that it introduces new matter into the disclosure of the invention.

The added material that the Examiner refers to is as follows: ". . . said openings being of a size so as to limit mass transport of an associated fuel substance therethrough to said anode face of said membrane electrode assembly to produce electricity-generating reactions and to allow the mass transport of carbon dioxide produced in said reaction away from said membrane electrode assembly" in claim 24. In addition, the Examiner objects to the following language: ". . . said openings being sized to limit the transport of oxygen to said cathode face of said membrane electrode" in claim 44.

Applicant respectfully submits that this added language does not represent new subject matter. Indeed, the subject matter of the added language is included in the original disclosure in a number of passages, including the Summary of the Invention, the Detailed Description and the Abstract of the Invention.

For example, in the Summary of the Invention, beginning at line 7, it is stated that:

In accordance with another aspect of the invention, the metallic component is fashioned as both a diffusion layer and a flow field plate. This structure may be employed as to one or both diffusion layers as desired or necessary for a particular application. In this embodiment, the layer component acts to both diffuse the chemical substances to and from the reactive sites on the PCM and to control the overall flow of reactants and byproducts of the reaction, thus limiting the potential for saturation of the PCM. (Specification, page 7, lines 18-23. Emphasis added)

The Summary of the Invention also states:

As described more fully herein, the layer component can be treated with a hydrophobic substance to make at least a portion of the component hydrophobic, or hydrophilic in nature to enhance and control the flow of gases and liquids within the fuel cell. These treatments may be used in conjunction with active reactant and byproduct management systems for supplying at least one of the reactants to the membrane and/or assisting in transporting at least one of the byproducts away from the membrane. (Specification, page 7, lines 7-12, Emphasis added.)

Furthermore, with respect to carbon dioxide, the Summary of the Invention further states that the function of the metallic component is "to allow unreacted methanol

and carbon dioxide and other byproducts (on the anode side) to travel away from the anode face of the PCM . . . ." (Specification, page 7, lines 25-27).

In the Detailed Description, the discussion of Fig. 3C includes a statement about the pore distributions of the component. More specifically, on page 14, line 25 the Specification states as follows:

Such pore distributions as illustrated in Figure 3C are very useful for facilitating the anode and cathode reactions by creating discrete and continuous mass transport paths through the metallic component for each of the liquid reactants and byproducts, and the gaseous reactants and byproducts.

In other words, pore sizes, the pore location/distribution and the hydrophobic (or hydrophilic) treatment facilitates management of mass transport of reactants and byproducts through the component. The selection of pore sizes and/or location, and/or hydrophobic/hydrophilic treatment will result in the desired level of control whether it is to limit the mass transport or to freely allow the mass transport. Thus, the statement that the component acts "to both diffuse the chemical substances to and from the reactive sites on the PCM and to control the overall flow of reactants and byproducts of the reaction . . . ." (page 7, lines 21-23), taken with the discussion of pore sizes, distribution and treatment, clearly encompasses the subject matter of the statement that "said openings being of a size so as to limit mass transport of an associated fuel substance therethrough to said anode face of said membrane electrode assembly . . . ." (Claim 24). These passages indicate that the functionality of the metallic diffusion layer component is, in part, to control the

flow of reactants and byproducts within the fuel cell. This control can include limiting flow of substances to and from the reactive sites.

It is further noted that the word "control", when functioning as a verb can have as a synonym, the word "limit." (Roget's New Millennium Thesaurus, First Edition, V.105 ©2004 by Lexicon Publishing Group, LLC, <http://thesaurus.reference.com>, May 20, 2004). In other words, in the passages of the Specification which discuss the component pores being sized to control and/or manage the flow of either gases or liquids support the claim language that the openings are of such a size as "to limit mass transport of an associated fuel substance...and to allow the mass transport of carbon dioxide" and the further claim language that the component acts to limit transport of oxygen.

Furthermore, the Abstract states:

"Another embodiment of the invention incorporates metallic layer components that are formed using particle diffusion bonding techniques and are then coated with hydrophilic or hydrophobic substances to control reactant flow and transport."

Accordingly, it is respectfully submitted the language added by amendment does not constitute new matter, and that no new matter has been entered into the application.

#### **Claim Rejections - 35 U.S.C. § 112**

Claims 24-62 were rejected under 35 U.S.C. § 112, first paragraph, on the basis that the amendments to the claims were not supported in the instant disclosure.

As set forth previously, Applicant has cited numerous passages that encompass and, thereby provide foundation and support, for the recitation that "said openings being of a size so as to limit mass transport of an associated fuel substance therethrough to said anode face of said membrane electrode assembly . . . ." For example, this recitation is supported, *inter alia*, by the above-cited passage that the component acts to both diffuse the chemical substances to and from the reactive sites on the PCM and to control the overall flow of reactants and byproducts of the reaction (Specification page 7, lines 21-23). To diffuse and control the substances, includes limiting the mass transport of the substances, such as the fuel substance and the oxygen.

The further claim language that the openings "allow mass transport of carbon dioxide produced in said reactions away from the membrane electrode assembly" is supported by the passage that: "This includes dispersing the fuel mixture to the anode face of the PCM, and dispersing oxygen to the cathode face of the PCM, as well as to allow unreacted methanol, carbon dioxide and other byproducts (on the anode side) to travel away from the anode face of the PCM . . . ." (Specification, page 7, lines 24-27).

And still further, the amendments to claim 24 and 44 are supported by other passages in the Detailed Description, such as the discussion of Fig. 7 which states that: "Reactants and byproducts are diffused, through anode and cathode components 702 and 704 respectively." (Specification, page 18, lines 2-3.)

In summary, it is respectfully submitted that the above-quoted statements in the disclosure along the lines that the component acts to diffuse and/or to control and/or to manage the flow and transport of reactants and byproducts support the recitals "to limit

mass transport of an associated fuel substance" (Claim 24) and "to limit the transport of oxygen" (Claim 44) because fuel substances and oxygen are reactants and the flow and transport of these reactants are being controlled, managed and/or limited by the metallic layer component. The amendment that the component acts to allow the mass transport of carbon dioxide away from the membrane electrode assembly (Claim 24) is similarly supported.

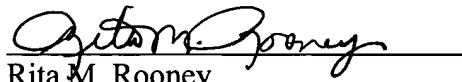
It is thus respectfully submitted that the claim amendments are fully supported in the disclosure, and Applicant therefore respectfully requests reconsideration of the rejection under 35 U.S.C. § 112.

Applicant respectfully acknowledges the withdrawal of other claim rejections.

There are no remaining objections or rejections and the Applicant thus respectfully submits that the application is now in condition for allowance. Please do not hesitate to contact the undersigned in order to advance the prosecution of this application in any respect.

Please charge any additional fee occasioned by this paper to our Deposit Account  
No. 03-1237.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Rita M. Rooney", is written over a horizontal line.

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